North Fulton Amateur Radio League NFARL eNEWS

February 2022

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Warren Merkel KD4Z; KiCad - An Electronics Design Automation Suite for Schematic and Printed Circuit Board Layout

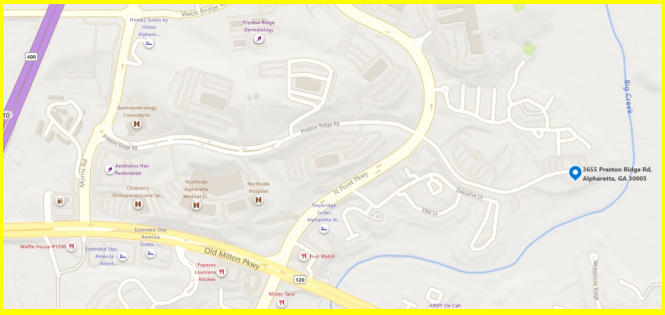
As hams, most of us have encountered folks to whom we think of as having "technology" engrained into their DNA. If you can't think of anyone that fits this category, then make sure you attend the February 2022 NFARL meeting. You'll have an opportunity to meet a gentleman who is a fine example of someone who embraces various aspects of technologies, is creative in ways to utilize them, and has a high level of skill in them.

Warren Merkel, KD4Z, is our guest presenter at our February 2022 NFARL club meeting. Warren will provide us with information on how he uses KiCad EDA, a software package for capturing circuit schematics and undertaking printed circuit board design. Warren is very proficient at this type of work. You can see examples where his use of the KiCad tool resulted in some very nice work inside the projects mentioned. This won't be a dry and boring presentation, as Warren is sure to provide more than just a tutorial on use of the software. You can read more about this topic in John N4IHV's "President's Corner" column in this edition.

Check out Warren's QRZ page and plan to join us on February 15, 2022 for our meeting. We'll be meeting in person at the Preston Ridge Community Center. The doors open at 7:00PM for some social gathering. The meeting will begin at 7:30PM and finish by 9PM. We'll also hold a Zoom session for those of you who may not be able to join us in person. The meeting invitation details are below.

NFARL February 2022 Meeting Location

Preston Ridge Community Center
3655 Preston Ridge Road Suite 100
Alpharetta, GA 30005



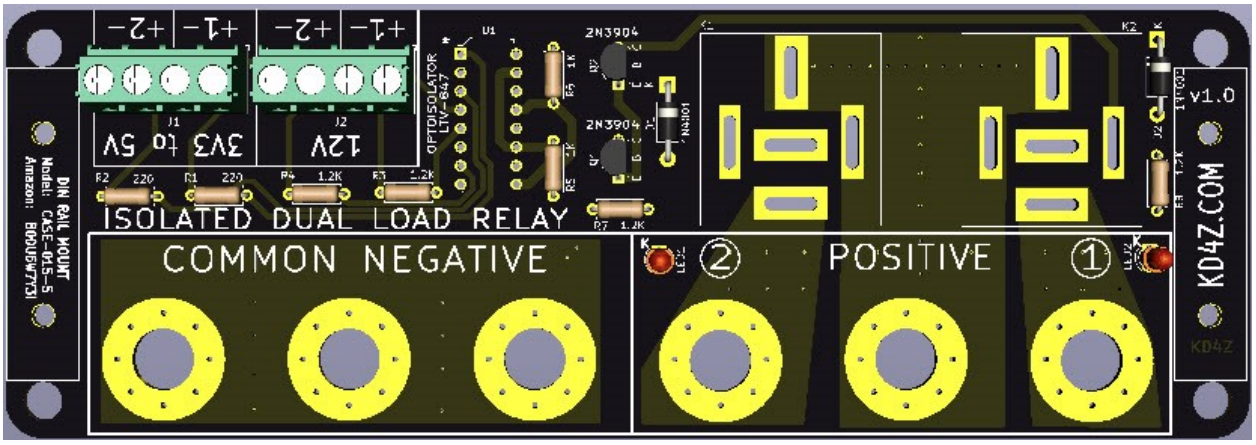
Zoom meeting information:

Join Zoom Meeting
https://us06web.zoom.us/j/86599970063?pwd=cWtrVGVIR29GRW05U01aT1lScmZWUT09
Meeting ID: 865 9997 0063
Passcode: 399187
One tap mobile

President's Corner / John Norris N4IHV

It looks like winter is finally here in the south. Outside antenna work will surely take on a different meaning. Take care on any towers or roofs where wires and antennae reside. This is a perfect time to build or repair something in your shop where it is warm and cozy. Contact one or more of our club members if you are not sure how to build or fix something. Winter is an excellent time to learn and improve your skills. Remember, we all had to learn so don't be shy to ask.

Warren, KD4Z, is giving a session on circuit design software, KiCad, at our February meeting. He plans to have boards for you to complete using the design he will discuss. It is an isolated dual relay switch board that can handle up to 40 Amps per channel. It is driven by either a 3.3 to 5 volt logic control signal or 12 volt signal. You can use it to remotely switch the power to your HF or mobile radios, directly from the IO pins of an Arduino or Raspberry Pi. These will be useful boards to have and he plans to sell them at his cost, which will be $20 each. It includes all parts for the completion of the board. There will only be 20 available at the meeting and it will be supplied on a first come basis. Don't miss this opportunity for a wonderful and educational experience. There will be a signup sheet at the door to obtain a kit.



For those who are concerned about our safety protocol, we are doing the following. Some have come and worn masks and some have not. It is purely up to one's discretion to mask or not. We are placing our chairs further apart for better separation. To my knowledge, we have not had anyone contract Covid from any of our in person meetings. We have a lot of new members and meeting in person puts a face to the name. There is something special about face to face experiences that have proven to be more important by each passing day. Please attend if you can.

See you soon,

John

N4IHV

60 Meters – The Forgotten Ham Radio Band / Scott Straw, KB4KBS

Tucked away between the 80/75 Meter band and the 40 Meter band is a little sliver of Ham Radio frequencies that are the newest acquisition to the world-wide allocation for Amateur Radio. The 60 Meter band, also known as the 5 MHz Band, originally came to be available to Amateurs only 20 years ago in 2002. In its inaugural years it was only available to a few countries, the United States, and the United Kingdom being chief among them. In the past two decades, more and more countries have permitted their Amateur Radio operators to use the band, either in its entirety, just portions, or sometimes just specific frequencies. We in the United State officially received the green light for 60 Meters after a Federal Communications Commission (FCC) Final Report and Order was released on May 14, 2003. If you have a yearning to read the entire document, you can find it here: https://ecfsapi.fcc.gov/file/6514285070.pdf .

If, on the other hand, your head swims trying to read long government documents, here is a summary:

> **General Class and above** US Amateur Radio operators were given access to **five specific 3 kHz-wide "channels" whose center frequencies were 5332 kHz, 5348 kHz, 5368 kHz, 5373 Hz, and 5405 kHz**. The FCC only permitted one transmission mode, **Upper Side Band (USB)**, and the power limit was a **maximum effective radiated power (ERP) of 50W Peak Envelope Power (PEP)**. We were **SECONDARY users** of the frequencies and were expected to yield to, and not interfere with, all primary stations authorized in the mobile and fixed services.

At the time of this initial, very restrictive authorization, the American Radio Relay League (ARRL) Chief Operating Officer David Sumner, K1ZZ, said, "In terms of Amateur Radio spectrum, we usually say, 'Use it or lose it.' The watchword for 60-meter operators should be, 'Misuse it and lose it.'" He then correctly predicted that Hams would "develop a record of disciplined, responsible use of the five channels in the public interest that will justify another look at these rather severe initial restrictions."

In March of 2012, the FCC revisited the 60M Amateur allocation and made some changes**. The maximum ERP was increased to 100W PEP** and permissible emission types were changed **to include CW and Digital modes**. Also, the named frequencies for **the channels were revised to be 5330.5, 5346.5, 5357.0, 5371.5, and 5403.5**. These represent the "dial frequency" of radios transmitting USB voice with a 2.8 kHz bandwidth suppressed carrier. The CW "dial frequency" of the five channels would continue to be the original frequencies, which are in the center of the channel (EXCEPTION: Channel 3 was shifted down 9.5 kHz from its original location; see tables below).

Table 1 USB dial display:	**Table 2 CW dial display:**
Channel 1: 5330.5 kHz	**Channel 1: 5332.0 kHz**
Channel 2: 5346.5 kHz	**Channel 2: 5348.0 kHz**
Channel 3: 5357.0 kHz	**Channel 3: 5358.5 kHz**
Channel 4: 5371.5 kHz	**Channel 4: 5373.0 kHz**
Channel 5: 5403.5 kHz	**Channel 5: 5405.0 kHz**

If you are inclined to use digital modes, the ARRL has only provided clarification on two modes: PSK-31 and PACTOR III. From their website (http://www.arrl.org/60m-channel-allocation):

"Our expanded privileges on 60 meters were the result of collaboration between the FCC and the NTIA – the National Telecommunications and Information Administration, the agency that manages and coordinates telecommunications activities among US government departments, the primary users of the band. The NTIA expressed concern about possible interference and requested that amateurs limit digital operating to PSK31 and PACTOR III only."

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60 Meters – The Forgotten Ham Radio Band / -continued from page 3

For PSK-31, use the USB dial display (Table 1) and put your cursor at 1500Hz, which is essentially the center of the channel (the frequencies in Table 2). For PACTOR III, simply use the frequencies shown in Table 1.

What about using FT8 on 60 Meters? The use of FT8 on 60 Meters is still a bit nebulous on two counts – is FT8 a "legal" mode on 60M, and where can FT8 be transmitted? This is from the ARRL web site and their 60 Meter Frequently Asked Questions (FAQ) page (http://www.arrl.org/60-meter-faq):

> "The FCC Report and Order permits the use of digital modes that comply with emission designator 60H0J2B, which includes PSK31 as well as any RTTY signal with a bandwidth of less than 60 Hz.
> The Report and Order also allows the use of modes that comply with emission designator 2K80J2D, which includes any digital mode with a bandwidth of 2.8 kHz or less whose technical characteristics have been documented publicly, per Part 97.309(4) of the FCC Rules. Such modes would include PACTOR I, II or III, 300-baud packet, MFSK, MT63, Contestia, Olivia, DominoEX and others.
> On 60 meters hams are restricted to only one signal per channel and automatic operation is not permitted. In addition, the FCC continues to require that all digital transmissions be centered on the channel-center frequencies, which the Report and Order defines as being 1.5 kHz above the suppressed carrier frequency of a transceiver operated in the Upper Sideband (USB) mode."

To the first question, is FT8 allowed on 60M, the salient point for this discussion is the phrase "… any digital mode with a bandwidth of 2.8 kHz or less whose technical characteristics have been documented publicly…". It would seem that FT8 qualifies.

The second question about where inside the 2.8 kHz channel the 50H0J2D (50Hz wide, Single-sideband, Digital, Data transmission) signals can be transmitted is a bit murky. Notwithstanding the ARRL admonition that "the FCC continues to require that all digital transmissions be centered on the channel-center frequencies, which the Report and Order defines as being 1.5 kHz above the suppressed carrier frequency of a transceiver operated in the Upper Sideband (USB) mode", you will find FT8 signals throughout the 2.8 kHz Channel 3 window. A strict interpretation of this statement would mean Hams could only transmit FT8 signals at 1480Hz on their WSJT-X/JTDX waterfall (5358.480 kHz if their radio base frequency is 5357.0 kHz).

I will refrain from further commentary on this issue except to say this: If we don't abuse it I don't see a reason to be worried. Because of the secondary status of Amateur Radio on 60 Meters, we have an obligation if we perceive there is activity that is ***not*** of a secondary nature occurring, to cede usage of the band to primary stations (typically US Government agencies or liaisons).

In an email exchange with Bart Jahnke, W9JJ, the ARRL Radiosport and Regulatory Information Manager, he said this about 60 Meters and FT8 operations there:

> "In the end we have to measure how important is it for us to operate on a band where the purpose of operating is not in the competitive aspect, but instead in the demonstration of what can be accomplished when we are called upon to provide emergency communications; seeking out a band that provides the best propagation to our partner organizations or our emergency communication nets. Some would argue that FT8 is not a mode that supports emergency communications, even so if the need is to say send emergency supplies, send water, send food, send insulin, those short burst messages can be sent with FT8 - In similar fashion to a field day exchange.
> Focusing on what we can accomplish with the band, from the standpoint of supporting a handful of emergency communications transmissions, to me should be the focus."

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60 Meters – The Forgotten Ham Radio Band / -continued from page 4

I appreciate what Bart said because it makes sense, and puts things in perspective. The 60M band is a great resource we have been given permission to "borrow when it isn't busy". The propagation characteristics of the band would make it ideal for regional Emergency Communications (EMCOMMs), and while Bart may not be aware of this (or didn't recall it at the moment), JS8Call, a FT8-based digital mode we all know and love locally because it was created by NFARL's very own Jordan Shearer, KN4CRD, would be the perfect candidate for digital EMCOMMS on this band. There is no "contesting" allowed on 60M, and because it is not a universally available set of frequencies world-wide, 60 meter contacts are not eligible for DXCC applications.

When I first tried to venture out into this band, I found that my Yaesu FT-450D was very restrictive in how I was "allowed" to get to these channels. It has the five frequencies for 60M hard -coded into five memory slots on my radio. The dial display on my radio is the center frequency of each channel (Table 2) and I am only allowed to toggle between USB and CW with my mode selector. I have learned however, that in USB mode the VFO is actually tuned to the Table 1 frequencies. I have not tried to send CW, but I presume in that mode the VFO is tuned to the Table 2 frequencies. You may encounter similar opportunities for learning with your radio.

I would encourage you to pay a visit to 60 meters sometime and take a listen. Maybe call CQ using USB on channels 1, 2, 4, or 5 (the de facto DX channel). If there is enough interest-dust kicked up on the email reflector, maybe after a Tech Net, we can have roundtable on one of the 60M USB channels; treat it like a repeater – pauses between transmissions for people to identify, some semblance of a rotation, etc. If you are a FT8 aficionado give it a try on channel 3. If you're in the "strict interpretation" camp, put your TX at 1480H and check the "HOLD TX FREQ" box in WSJT-X or JTDX.

Yes, the 5 MHz/60 Meter radio band is not without some quirks, but it's ours to borrow as Amateur Radio operators so long as we take care of it and don't abuse it. Hopefully you too will find some time to explore this unique frequency allocation and eventually gain access to" the forgotten band".

Elmer Coordinator Role Update- / Mike Riley, KN4OAK

Chuck Catledge, AE4CW, recently stepped out of his long served role as Elmer Coordinator for the club. Chuck will still be around, so don't worry. You'll be able to catch him at meetings and OTA.

In the meantime John Hathcock, WE4AUB, agreed to accept the role as Elmer Coordinator going forward. Please join us by taking a minute to a) thank Chuck for his service, and b) welcome John to his new role as Elmer Coordinator for the club.

John recently upgraded to Amateur Extra. He enjoys SOTA, POTA, kit building and antenna design and fabrication. We look forward to John's contribution to Elmer resource and activity coordination. Please reach out to John to say hello, tell him about what your Elmer needs and interest are, and to thank him for stepping up to help out.

Interesting Test Session In February / -Wes Lamboley, W3WL

Slope's Barbecue was again the site at which Ian Kahn- NV4C and his team of volunteer examiners provided license exams on Saturday, the 12th. It was especially interesting because nearly all the guys taking the tests were able to hang around after and chat. Eight guys either advanced, got new licenses, or were grandfathered to their old General Class license! I was wishing more of the Club could have been there, as it was almost like a pre-meeting session we always have at the regular meetings! Some interesting takes on the February class follows:

Joel Anderson

Joel Anderson originally got his Novice and General class licenses back in 1963/4, but let his license lapse. He was Grandfathered into a new General license, and plans to get active again. He used to work at Kimberly-Clark as a scientist, and his first project is to get an old ARC-5 transmitter going again!

Kevin Brennan, KO4TEL

Kevin Brennan - KO4TFL upgraded to General. He was interested in getting an HF rig, and we discussed various options for him. Kevin works at Cox Communications.

Robert Achtenberg-KO4QJK also upgraded, and joined in discussion on getting an HF rig with Kevin. Antennas and "Elmer" help from the Club was also discussed. Robert is a computer programmer at PAYCOR, and is interested in digital modes.

George Pitcock got his Technician license. George is a junior at Kennesaw State and is studying Mechanical Engineering. His interest in ham radio began with his hobby - paragliding off Lookout Mountain. It turns out parapilots use ham radio to communicate whilst soaring. I cannot wait to try it - NOT!

George Pitcock

Robert Achtenberg, KO4QJK

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Interesting Test Session In February / -continued from Page 6

Dan Hale K4YDL

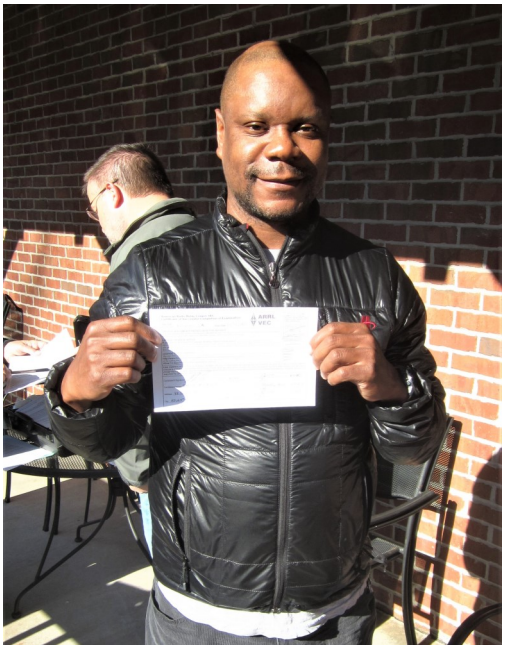
Mark Neely got his Technician, and is a Mechanical Engineer with ALCON. He was telling us how much they need engineers, and there are not enough out there to hire. Mark likes to build and fly radio controlled planes, and is also very interested in QRP/Summits On The Air.

Mark Neely

Dan Hale - K4YDL, upgraded to General and is currently a member of the Club. Dan also joined in the rig and antenna discussions, and is looking forward to his new privileges.

Stephan Youmans took both the Tech and General exams and passed them both! I think it came naturally to him, as he is a Georgia Tech grad in EE! He currently is an Engineering Manager at NCR.

Gary Benjamin got his Tech as well, and wants to be able to communicate while he is "off-roading" in the GA Mountains. He is also an avid mountain biker.



Gary Benjamin

It was great to get to know these guys a little in the time we had, and we are looking forward to seeing them at the Club meetings!

Stephan Youmans

The Military AN/TRC-97 / Tony Santoro, WA3TRA

I was drafted in 1972 and served in the Air Force as a Radio Relay Equipment Repairman. I served between December 1972 and 1976. During that time I was assigned to a mobile group and worked on the AN/TRC-97 microwave communication system. This system supported 24 analog channels and was used for communications with a mobile command center.

Figure 1 shows two large microwave dishes used for tropospheric scatter. The signals were fed to a signal comparator which could switch between dishes for best reception. Notice the inflatable building in the background, manufactured by the Hughes Corporation. Figure 2 shows the same type of setup as in Figure 1, but using feed horns for line of sight connection. This setup could also be used as a repeater.

Figure 1

Figure 2 AN/TRC-97 with aligned horns

Fast forward to present

I am studying for the Extra Exam and using YouTube on-line videos. In one video, there is a slide reference to a web site: RF Communication-Electronics Course (RFCEC). On the site, the author, K4RFE, has one very long main page with a bio on his Marine Corp career. Scrolling about halfway down the page **you will see the same TRC-97 equipment**. Apparently, he also supported the same equipment during the same time period. I tried to reach out to the person through the email provided on the web page and the QRZ reference, but no luck. We are in the people business, so contacting this person is important to me and will probably make his day. Hopefully I will be able to reach him someday. My bio on QRZ.com also lists some information. For more details on the TRC-97, Wikipedia has a great reference: AN/TRC-97 - Wikipedia

That's all for now and 73's

Tony, WA3TRA

NFARL SHINES AT GEORGIA SCIENCE TEACHERS CONFERENCE /
Martha Muir, W4MSA

NFARL President John N4IHV and NFARL Secretary Martha W4MSA, along with Daryl K4RGK and Nathan K4NHW, joined over 600 science teachers at the Georgia Science Teachers Association's Annual Conference in Peachtree City on February 10th and 11th, 2021. We were representing the GA Section-AARL at this conference. Our two main goals were encourage teachers to (1) \apply to attend the ARRL's Teachers Institute on Wireless Technology and (2) apply to host an ARISS radio contact at their school.

To demonstrate to ARRL that there is a growing interest in electronics and wireless technology among teachers in Georgia, we encouraged teachers to apply to the ARRL Teachers Institute and to write "ATL" next to their name on the application. This might inspire the staff at ARRL to hold one of their summer workshops in Georgia. This would give a group of teachers in Georgia the knowledge and skills to educate their students about wireless technology. This could increase the students' curiosity and steer them toward careers not previously considered. We encouraged everyone who came by our booth to attend this excellent program. We also visited other booth presenters in hopes that they would encourage fellow teachers they encounter or work with to apply for the Institute.

We spoke to teachers about the wonders of the ARISS program. ARISS stands for 'Amateur Radio on the International Space Station.' The window to apply to host an ARISS contact opens February 21st, 2021, so we wanted to give them information about how to apply and reasons why to do so. Our chats about the ARISS program usually began by showing the moving icon of the ISS on the Geochron we had in our booth. Everyone was mesmerized by the Geochron's display. Two young gals, who accompanied their mother through the Exhibit Area, loved to watch the ISS icon move while John and Martha talked with their mother.

To make an ARISS contact with the ISS, you must use a special antenna that can track the ISS's movement. Daryl and Nathan set up a satellite contact station outside in the parking lot to show teachers how this is done. If a satellite were passing over while they were there, the teachers were encouraged to talk on the radio with the station Nathan and Daryl had set up. The two young gals (along with their mother) mentioned before were among those who visited the satellite station. Again, those young gals were fascinated by what we were offering.

Rachel Jones KO4HLC brought her unbridled enthusiasm for everything STEM to our booth on Friday and joined us in our missions. Rachel is the research scientist from the Augusta area who oversaw the ARISS contact and pre-contact 'Ham 101' course at Savannah River Academy near Augusta. She brought excitement and enthusiasm to our booth.

On Thursday, Martha presented a break-out session on the ARISS program for schools. As part of her presentation, she encouraged the teachers to go out to see Daryl and Nathan run their satellite station. She also talked with the attendees about the Teachers Institute. The session concluded with great questions asked by the teachers.

On Friday, Rachel presented a break-out session on launching and tracking high altitude balloons, like she had the students do at Savannah River Academy. She also encouraged attendees to visit Daryl and Nathan outside and to apply for the Teachers Institute and the ARISS program.

John and Martha consider hosting a booth at this event to have been a successful experiment and adventure. It appeared that the teachers we spoke with at our booth "couldn't wait" to apply to the Teachers Institute and/ or apply to host an ARISS contact. Our goal was to get at least ten teachers to apply to the Institute, but we are hopeful that our efforts at this convention will bring more than that, as well as bringing lots of participants to the ARRIS Program and The Teachers Institute on Wireless Technology.

NFARL SHINES AT GEORGIA SCIENCE TEACHERS CONFERENCE /

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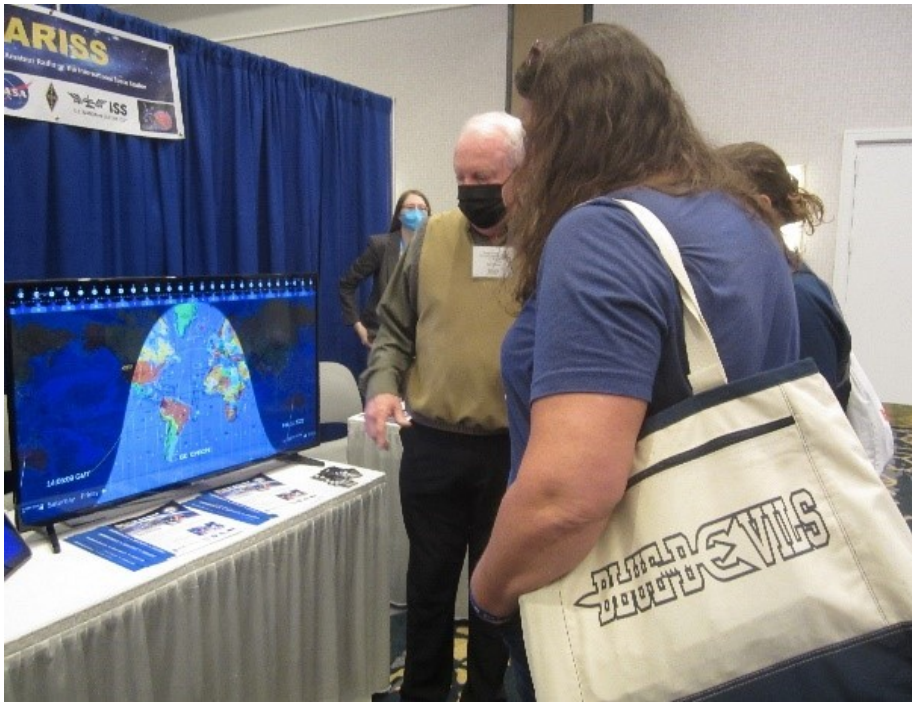
We left the Conference tired but happy at the work we had done. We hope we represented ham radio well to the teachers and that this, along with the Teachers Institute and the ARISS program, will encourage more schools to establish a ham radio program at their schools.

Martha and John talking with visitors to our booth

John pointing out the ISS on the Geochron. Notice Rachel in the background.



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NFARL SHINES AT GEORGIA SCIENCE TEACHERS CONFERENCE /

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Daryl and Nathan setting up their satellite station in the parking lot.

Daryl and Nathan taking a break from setting up their satellite station.

Weatherproofing Coax Connections

It's a rare station that doesn't have a few PL-259s out back that need to be "sealed" from the weather. Left unprotected, water quickly enters coax connectors and, via the connector, enters the coax itself. The shield in coax cable has lots of surface area and lots of open spaces. It is a perfect medium for capillary action.

You will encounter used coax where the copper shield is black. That's from water incursion and that coax is useless. What has always amazed me is how far back from the "wet end" the shield can be black. I have stripped coax back 10 feet and the shield is still black. Coax loves to soak up water.

Many old timers know the basics for weatherproofing coax connections yet there are a few techniques many seem unaware of. Newer hams may not know the techniques at all, so I'll cover the subject as thoroughly as I can this month.

Before I get to how to weatherproof a coax connection using best practices, I'd like to note how many YouTube videos there are on this subject that describe poor practices. I'm surprised how bad some of them are. Two videos in particular have been posted by respected companies in the ham market who should know better. They are embarrassing. Ill provide screen captures below depicting egregiously bad advice.

The basics for obtaining good weatherproofing are simple. What's required is two types of tape and a pair of scissors (or diagonal cutters). That's all you need.

Here are the techniques and tips. I'll use a typical PL-259 to barrel to PL-259 splice as an example, but the same techniques apply to other outdoor connections. After the discussion on techniques, I'll describe the materials used.

Start with clean, quality connectors. I did an *Around the Shack* column on UHF connectors some time ago; there are lots of bad ones available at hamfests for $1. "Amphenol or not at all" will set you back $4 a connector and be worth every penny. The PL-259 center pins should slide snugly into the barrel connector. If they don't – STOP. Find connectors that provide a snug fit. You are about to seal the connection under layers of tape making it hard to troubleshoot and repair later.

Seat the nipples on the PL-259s into the indents in the barrel and tighten the PL-259s with pliers. More than hand tight, less than "pipe wrench" tight.

Wrap the connection with self-amalgamating rubber based tape. The start of the wrapping should begin at or near the center of the connectors, NOT AT THE OUTSIDE EDGE OF THE WRAPPING (Figure 1). Each lap of the tape should overlap the prior lap by approximately 50%. The tape should be pulled tight as it's applied – tight enough to reduce its width by about 25%. It can be pulled to near its breaking point to get into voids at critical spots. The end of the wrapping should be cut from the roll with scissors or diagonal pliers. DO NOT yank the tape apart with your hands. On the final layer, circle back from the edge of the wrap back toward the center. We want the starting end of the tape buried under tape and the end of the tape to end near the center and not at the end of the layer. The self-amalgamating tape layer should extend at least two inches past the end of the connectors.

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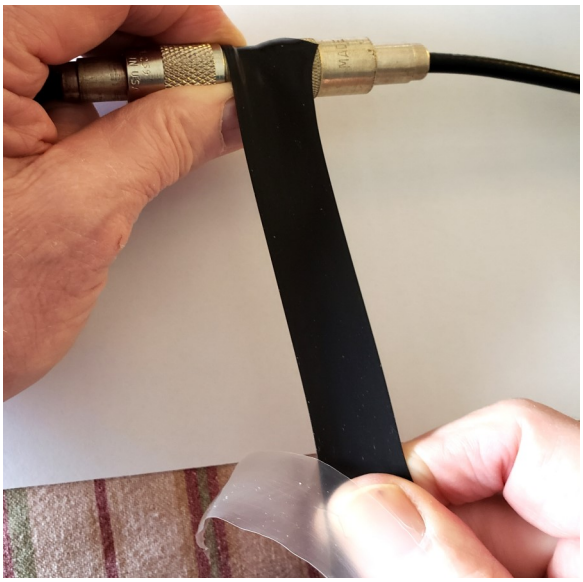

Figure 1. Begin tape layers at the center of the splice, not at the ends.

Wrap over the self-amalgamating tape with vinyl based tape. Again, the start and finish of the wrap should not be at the ends of the layer. Start the wrap in the middle of the splice. End the wrap by circling back from the finish end. Layers should be about 50% overlapped and the end should be cut from the roll, not yanked apart. The 3M data sheet (for the products described below) recommends pulling with sufficient force to narrow the tape to approximately 5/8^{ths} its original width. This number is not critical. This vinyl layer should extend at least one inch further out than the ends of the self-amalgamating tape underneath.

Materials and Concepts

3M makes an excellent self-amalgamating rubber-based tape: Scotch 130C. Scotch 2155 (Temflex) also works well. Personally, this is one area where I have had good luck buying hamfest "mystery tape" for the intended purpose. For years it has been $6 a roll – it never seems to change. Make sure the tape is self-amalgamating – it will have a layer of Mylar between the tape layers to prevent it from bonding to itself. Most self-amalgamating rubber tape is not UV resistant. It provides weatherproofing, but it can't stand long exposure to the sun.

For decades hams have used Scotch 33 (now called Scotch Super 33+) as the outer tape layer. It is there primarily for UV protection for the underlying rubber tape, but it has another important purpose. Scotch Super 33+ is abrasion and puncture resistant - rubber tape is not. Most connections rub against tower legs, get dragged across terrain, rub on rotors when used as rotor loops, etc.

Figure 2. Scotch Super 33+ tape, self-amalgamating tape and Scotch Super 88 tape

3M now makes a tape similar to Super 33+, designated Scotch Super 88. Both are fine for ham radio use. Super 88 is 8.5 mils thick and provides additional abrasion resistance over Super 33+, which is 7 mils thick. Rolls of 3M Super 33+, Self-Amalgamating tape and Scotch Super 88 are shown in Figure 2.

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If it occurs, water ingress will begin at the end of a tape wrap. It's nearly impossible to get the ends of a tape wrap weatherproof using two very common mistakes:

- Hand yanking the tape apart from the roll

- Starting and or ending a layer at the end rather than near the center of the splice.

- An experiment: Take a look at the ends of tape hand-yanked off a roll. Try to get those ends to adhere properly to an underlying layer of tape or to coax – you can't do it. Beginning and ending the tape away from the ends of the splice allows application at correct pressure (stretch) to be applied at the layer ends during application.

Tape temperature performance is an interesting subject. The packaging on both Scotch Super 33+ and Super 88 list the tape temperature as 0 F to 221 degrees F. The packaging does not use the words "operating range." Since we hams use outdoor connections well below 0 F, I called 3M and asked about it. It was explained that the range 0 F to 221 F is the range 3M guarantees the tape will "retain all its properties." It can be used below 0 F with no concern for hams applications. Scotch's vinyl tapes will not embrittle until down around minus 50 degrees. If there is a concern, it's storing tape for long time periods at high temperature. This can cause the adhesive on vinyl tape to migrate from the "sticky side" to the underlying "not sticky" side, making the tape impossible to unroll. "Don't store your tape in a hot garage - you may not be able to unroll it" was 3M's advice. EBay is known for supplying Scotch 33 that can't be unrolled. The Super 33+ data sheet indicates the tape should be applied when the temperature is between 0 F and 100 F. [Humor note: This is not the "ham way." Hams apply tape outside in howling snowing storms.]

Occasionally you my encounter a recommendation to apply silicone dielectric grease to the coax connectors as a first step. If enough is used, grease will keep water out of the connectors, but if you have worked with dielectric grease you know how difficult it is to control. Every time I've tried using it, it's gotten all over everything. Neither of the tape types will adhere to grease and it results in working with a mess. If the tape layers have been applied properly, the grease is worse than unnecessary. I recommend against using it.

Figure 3. A screen grab from YouTube demonstrating two mistakes. The tape end is at the end of the wrap and not circled back toward the center, and, the tape is being parted from the roll by hand yanking. This end will not seal.

- Continued on next page

Figure 3 and 4 are screen grabs (sorry for quality) of well-intentioned YouTube videos that include hand yanking rather than cutting with scissors, starting winding at the edges instead of the center of the splice and not adding a UV protective layer.

Figure 4. A screen grab from YouTube demonstrating one and possibly two mistakes. A conforming putty-like material is used to "seal" the front of a PL-259 connector shell to a grounding block while leaving the back of the connector wide open to water ingress. Also, the product description makes no mention of the material's UV tolerance. Will it last in the sun? The manufacturer makes no claim.

Good luck weatherproofing your outdoor connections. If you use proper materials and follow tried and true methods you will have weatherproof connections that will be trouble free for years.

Please note: Scotch, Super 33+, Temflex and the Scotch plaid design are all registered trademarks of 3M company.

73,
Hal N4GG/4

Extra Extra! / *From the Extra Class Question Pool*

New info for Technicians and Generals and a refresher for Extra Class Licensees!

E3A10
Which type of atmospheric structure can create a path for microwave propagation?

A. The jet stream
B. Wind shear
C. Temperature inversion
D. Dust devil

See answer on the last page!

The new Amateur Extra-class license examination question pool, effective from July 1, 2020, through June 30, 2024, has been released and is available at the National Conference of Volunteer Coordinators (NCVEC) website.
Note the new Technician class license examination question pool will be effective July 1, 2022.

Ian NV4C and his team hold license test sessions on the second Saturday of each month. For more information including upcoming test dates, click here.

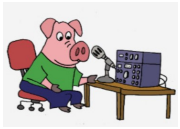
Contest Corner

These are some contests and events besides the "routine K1USN, CWops, and other organizational events" scheduled to occur the near future

Contest Name	Time & Date
+ ARRL School Club Roundup	1300Z, Feb 14 to 2359Z, Feb 18
+ Walk for the Bacon QRP Contest	0000Z-0100Z, Feb 17 and
	0200Z-0300Z, Feb 18
+ ARRL Inter. DX Contest, CW	0000Z, Feb 19 to 2400Z, Feb 20
+ FISTS Sunday Sprint	2100Z-2300Z, Feb 20
+ Run for the Bacon QRP Contest	2300Z, Feb 20 to 0100Z, Feb 21
+ SKCC Sprint	0000Z-0200Z, Feb 23
+ South Carolina QSO Party	1500Z, Feb 26 to 0159Z, Feb 27
+ High Speed Club CW Contest	1400Z-1700Z, Feb 27
+ North Carolina QSO Party	1500Z, Feb 27 to 0100Z, Feb 28
+ QCX Challenge	1300Z-1400Z, Feb 28
+ ARRL Inter. DX Contest, SSB	0000Z, Mar 5 to 2400Z, Mar 6
+ ARS Spartan Sprint	0200Z-0400Z, Mar 8
+ SKCC Weekend Sprintathon	1200Z, Mar 12 to 2400Z, Mar 13
+ Oklahoma QSO Party	1500Z, Mar 12 to 0200Z, Mar 13 and 1500Z-2100Z, Mar 13
+ Idaho QSO Party	1900Z, Mar 12 to 1900Z, Mar 13
+ Wisconsin QSO Party	1800Z, Mar 13 to 0100Z, Mar 14

NFARL Upcoming Events and Dates

- **Every Sunday — NFARES net** - 8:30 PM - 147.06 MHz (+) PL 100
  All licensed hams are welcome, you do not need to be an ARES member!
  Check NFARES.org for more information.
- **Every Monday — Tech Talk** - 8:30 PM - 145.47 MHz (-) PL 100
  NFARL's flagship technical based "non check-in" net. The net is always better when using the web based chat room (Discord) but Internet is not required to join the net. Check NFARL Nets for more information and "how to". Here's the link to the NFARL server on Discord web app https://discord.gg/spr2a9D
- **Every Wednesday — Hungry Hams Lunch Bunch** - 11:15 AM
  Location: Slope's BBQ, 34 East Crossville Road, Roswell, GA 30075
  (770) 518-7000
  Dining Room is OPEN. Get Take Out if you can't stay!



- **Every Thursday — YL Net –** 8:00 PM - 9:30 PM - 145.47 MHz (-) PL 100
  Check NFARL Nets website for "how to." This is a great opportunity for YL's to get on the radio with other YL's! OM's (guys) are welcome to listen in to this YL net.
- **Every Wednesday — CW SIG –** 8:00 PM on ZOOM. Meeting ID is 815 5160 3634; password is CW-CHAT (all CAPS)
- **Every Saturday — Royal Order of the Olde Geezers "Breakfast"** - 8:45AM-10AM. This informal breakfast group on Saturday mornings is NOW ***AGAIN*** meeting IN PERSON. **A notice that Lodge Number 1 of The Royal Order of the Olde Geezers, will convey its weekly soiree at Reveille Cafe**, 2960 Shallowford Road, Marietta 30066 in the Kroger shopping center (Shallowford Rd and Sandy Plains). The festivities commence at 8:45 am on Saturday.
- **Second Tuesday — NFARES Meeting** - **March 8, 2022** ***Presently- Online meetings only.*** Check NFARES.org for more information.
- **Second Saturday – VE Testing - NFARL March 12, 2022 session**:
  By reservation only. See the "Test Sessions" web page for details & registration process. Contact Ian at nv4c.ian@gmail.com for questions / concerns / reservations.
- **Third Tuesday— NFARL Club Meeting** - February 15, 2022, 7:30 PM
  Live meeting! Preston Ridge Community Center - Zoom Included!
  —February 2022 Meeting: KiCad - An Electronics Design Automation Suite for Schematic and Printed Circuit Board Layout (see Page 1)
  Door opens at 7 PM for Social Networking. Meeting begins at 7:30 PM
- **Fourth Tuesday – NFARL Executive Team Meeting -** February 22, 2022, 7:00 PM. ***Online meeting only*** — monitor website and NFARL Groups.io reflector for updates.
- **Dalton Hamfest 2022— February 26, 2022** Dalton Pro Rodeo / Fairgrounds site. 500 Legion Drive, Dalton, GA 30721. Gate opens at 8AM. $5.00 admission at the gate. Free parking. Boneyard (Additional $5.00 for Boneyard space). Admission is eligible for all Prize Drawings. Concessions. ARRL sanctioned. VE testing at nearby Western Sizzlin. www.w4drc.com/hamfest

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North Fulton Amateur Radio League

P.O. Box 1741
Roswell, GA 30077

nfarl.org

eNEWS can be located online at:
https://nfarl.org/enews-index

Club Repeaters

Frequency—Description	P.L. Tone	Location
145.470 (-) EchoLink Node 560686 NF4GA-R	100 Hz	Morgan Falls
147.060 (+) Primary ARES Repeater	100 Hz	Roswell Water Tower
* 224.620 (-) Joint Venture with MATPARC	100 Hz	TBD
443.150 (+)	100 Hz	Roswell Water Tower
444.475 (+)	100 Hz	Morgan Falls
* 927.0125 (-)	146.2 Hz	TBD

** Currently off the air*

Club Call signs: NF4GA and K4JJ

Extra Extra answer: C (question E3A10)

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